SuperKEKB Ring operation status and plan
Response to previous BPAC

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Response to previous BPAC comments

- The root cause of the QCSR cryostat cold leak has not been identified.
- A close watch on the leak in the QCSR is very important. When trying to fix the leak, bolts should not be overtightened in order to avoid getting too close to the yield point of the material.
  - Detailed check to find the leak point of the QCS-R cryostat is planned in the summer of 2022 after extracting the QCSs. As shown in p.17 of the slide, the increase of the vacuum pressure in the insulation tank after 2021c-end was almost the same to that after 2021b. There seems no increase in the leak rate.

- The LER thyratron kickers are unexpectedly firing and need to be replaced.
- It is important to control the unexpected thyratron firings as this makes it dangerous to increase the LER stored current. Perhaps one can wire the thyratron trigger such that if any single thyratron fires then it will force all thyratrons to fire.
  - As shown in p.14, we have replaced the thyratrons of LER injection kickers with the higher withstand voltage. Unfortunately, some of the thyratrons which were kept longer time (not used) have shown much worse response on the accidental firing. We have replaced them again then the situation seems settled.
  - Monitoring system to find the “bad” thyratrons using several oscilloscopes have been implemented.
  - We are considering following (longer-term) countermeasures.
    - Double-kicker system to excite K1 and K2 with same thyratron. (Need big modifications, tuning mechanism (supplemental kicker) to adjust the kick and timing, etc)
    - Robust horizontal collimator heads (Carbon) tolerable direct hit of the beam.
    - Development of novel fast switch using ultra-fast / high voltage semiconductors.

- The root cause of the LER catastrophic beam losses that occur somewhere in the storage ring has not been understood.
- The catastrophic beam losses remain an issue and the committee highly encourages the background team's efforts to further narrow down the possible location of the source.
  - Fortunately, as shown in p.14, we did not have catastrophic beam loss in LER during 2021c. We are continuing to investigate the source and mechanism, including HER. Belle II group had installed fast loss monitors with accurate time reference around several beam collimators.